Big Data final project Natural Disaster & GPDs

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Project idea:

?

Obtaining Data:

Natural Disasters

- Simple Download (csv)
- 16000 recorded disasters
- Location, Date / Duration, Severity

EM-DAT
The International Disaster Databas
Centre for research on the Epidemiology of Disasters — CRE

Country GDP’s

- Worldbank API
- API call per country
- Yearly GDP
- 14000 Data points
- Country, Year, GDP value

THE WORLD BANK

Storing Data:

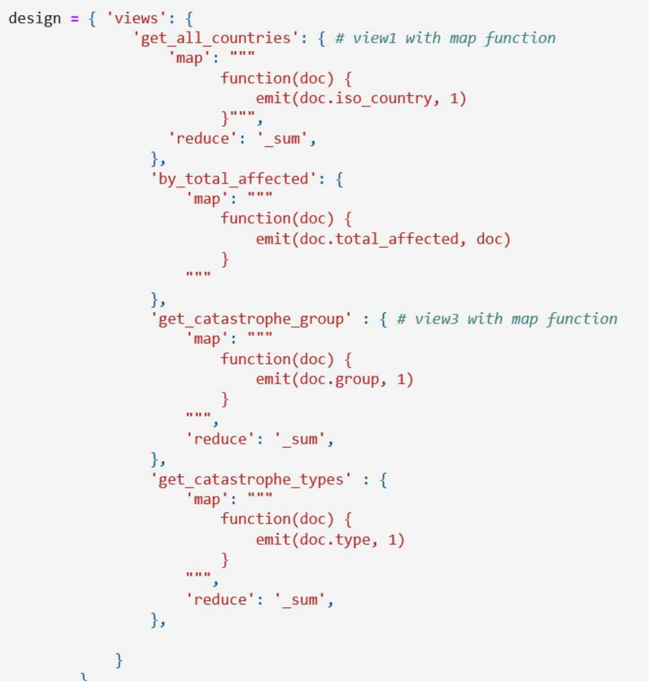
Database

- CouchDB
- Implemented with Docker
- Using json files
- Scalable

Upload

- API call **->** parse to object **->** upload to db
- No local saving required
- Table for Natural Disasters
- Table for GDP’s

Querying data: MapReduce



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design = { 'views': {
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                  'reduce': '_sum',
                },
                'by_total_affected': {
                    'map': """
                        function(doc) {
                            emit(doc.total_affected, doc)
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                    """
                },
                'get_catastrophe_group' : { # view3 with map function
                    'map': """
                        function(doc) {
                            emit(doc.group, 1)
                        }
                    """,
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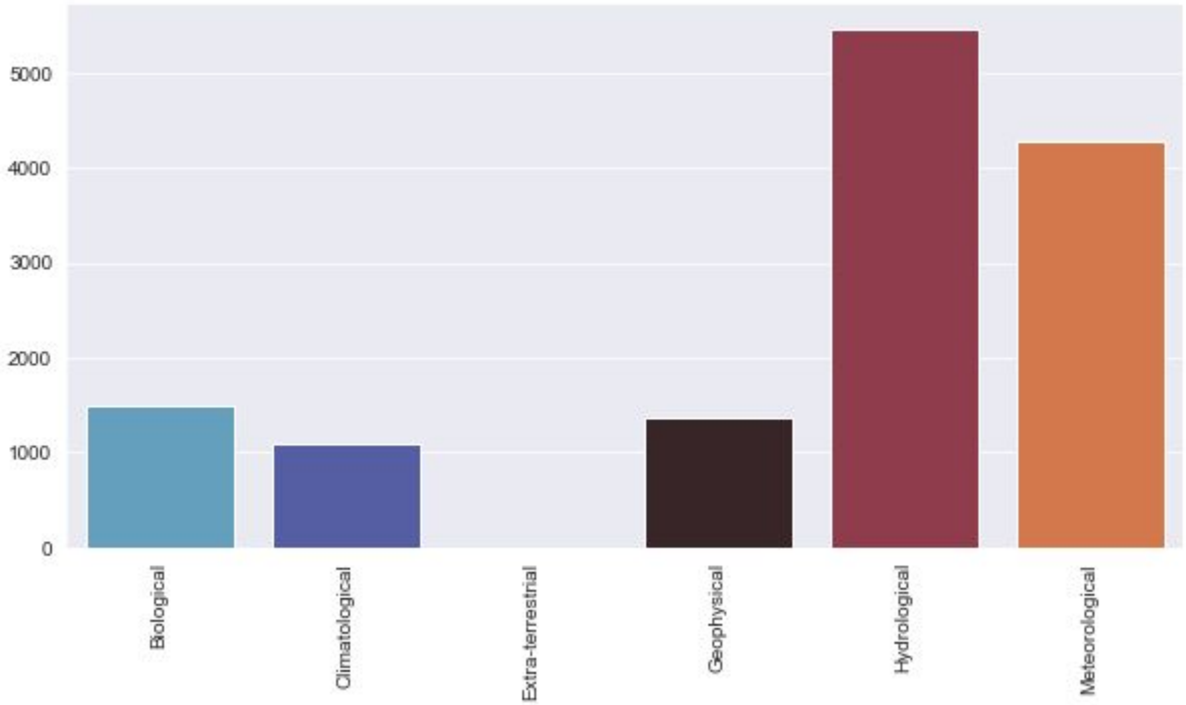
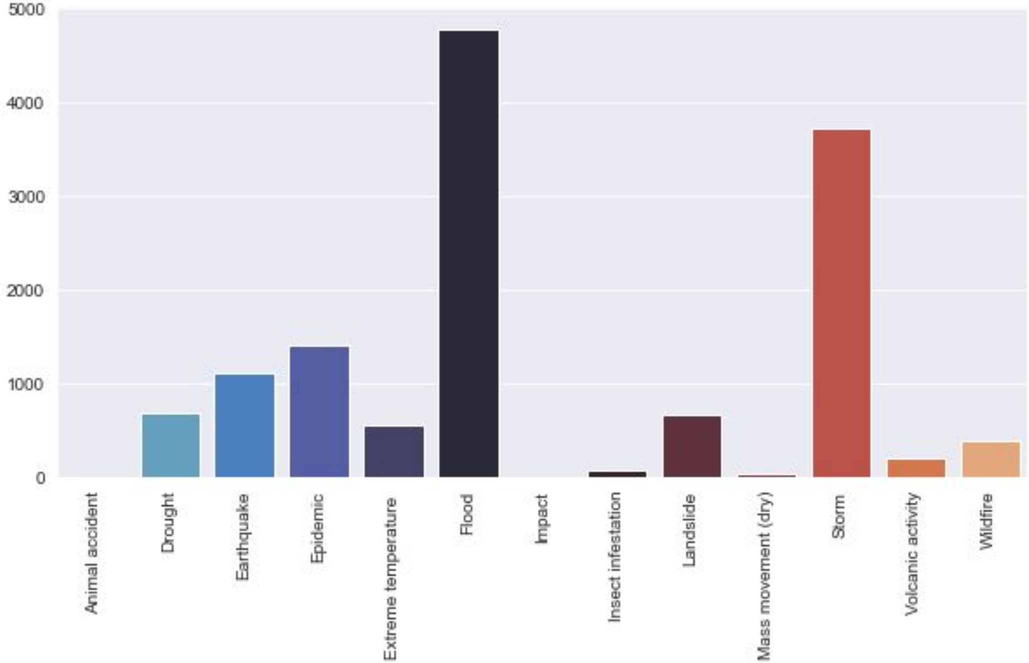
                    """,
                    'reduce': '_sum',
                },

            }
        }
```

Analyse data

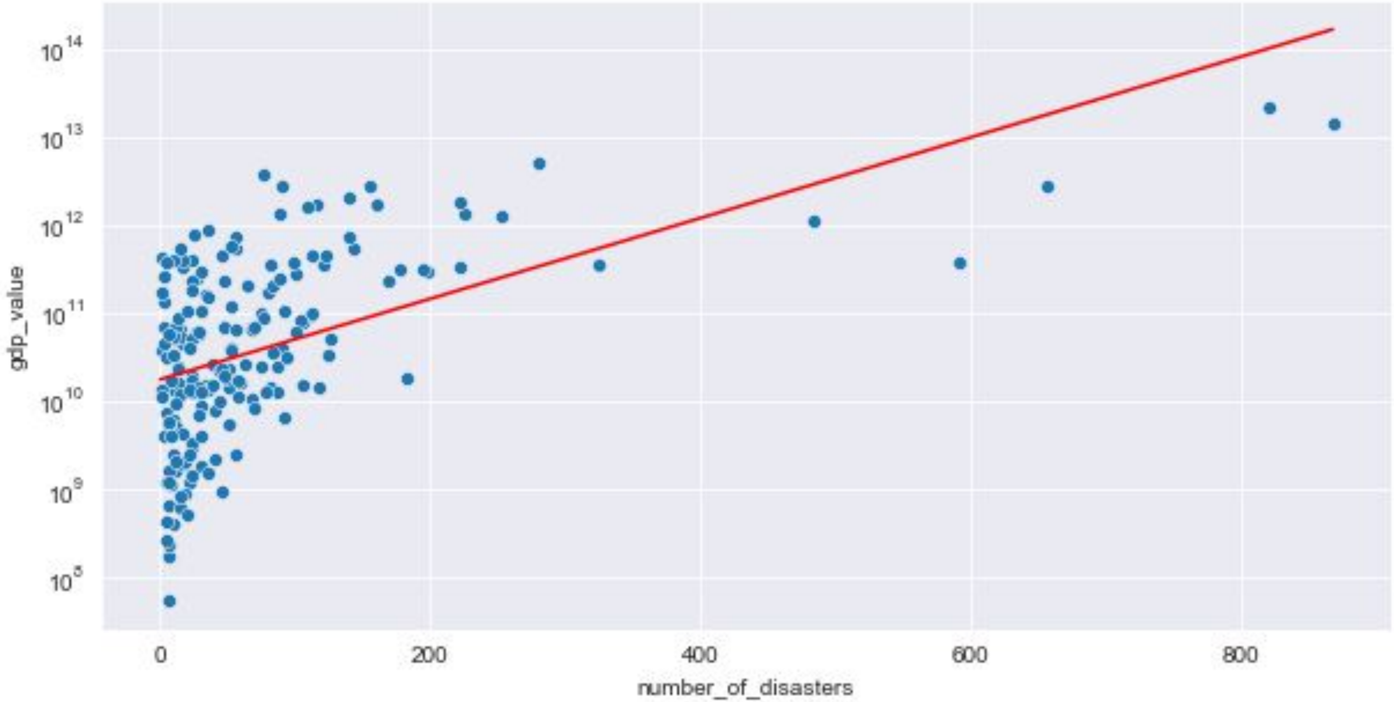


Analyse data



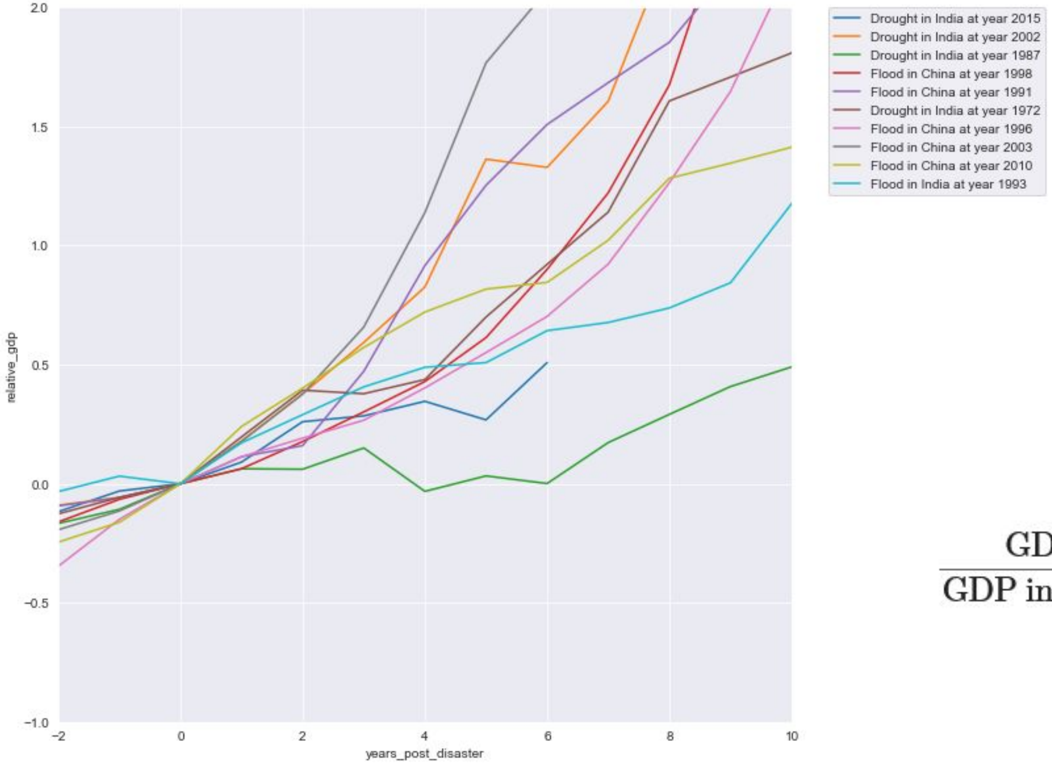
Analyse Data

Correlation: +**0.75**



years post disaster
vs
GDP

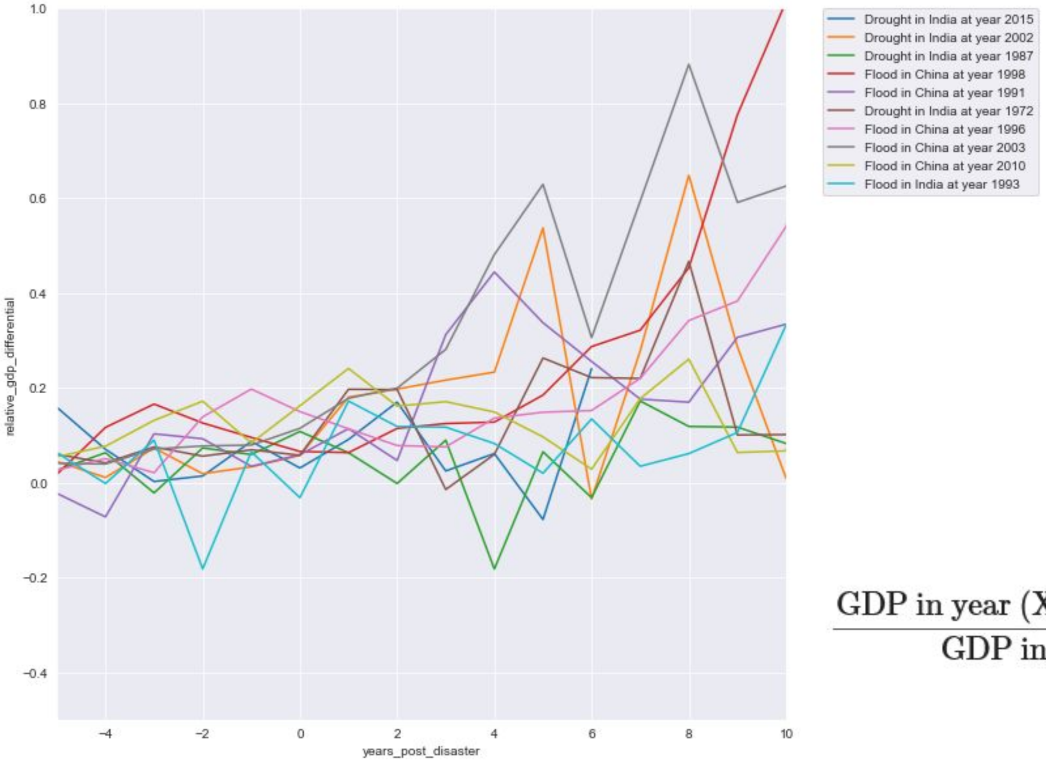
Analyse data



$$\frac{\text{GDP in year X}}{\text{GDP in year of disaster}} - 1$$

years post disaster
vs
change GDP

Analyse data



$$\frac{\text{GDP in year }(\mathrm{X}+1)-\text{GDP in year X}}{\text{GDP in year of disaster}}-1$$

Machine learning:

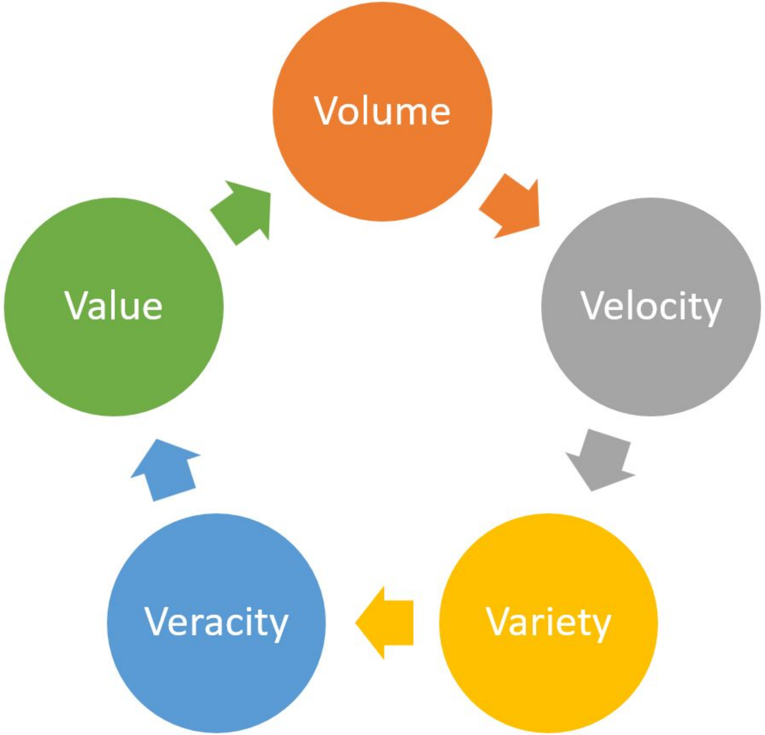
- create a connection to the CouchDB
- to take the Natural Disaster and the GDPs Data out.
- combine the data into a table.
- Dropping rows with NaN Values in the GDPs columns.
- making one-hot encoding for the ‘Type’ and ’Group’ columns.
- Split Data. The Target is gdp_change.
- Implement Linear Regression
- Calculate the Mean absolute error 18.87%

$$\mathrm{MAE} = \frac{1}{n}\sum_{i=1}^{n}|x_i - x|$$

Conclusions:

- positive correlation between GDP and number of disasters: 0.75
- hypothesis is contradicted
- disasters might be also an opportunity for economic growth through reconstruction
- other/more economic indicators needed: GPD per capita, GINI
- Linear Regression Algorithm MAE: 18.87%
- Natural disasters alone are not good enough as a predictor for GDP
- Correlation does not always mean causation

5Vs



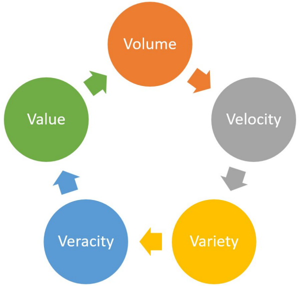
Volume

Velocity

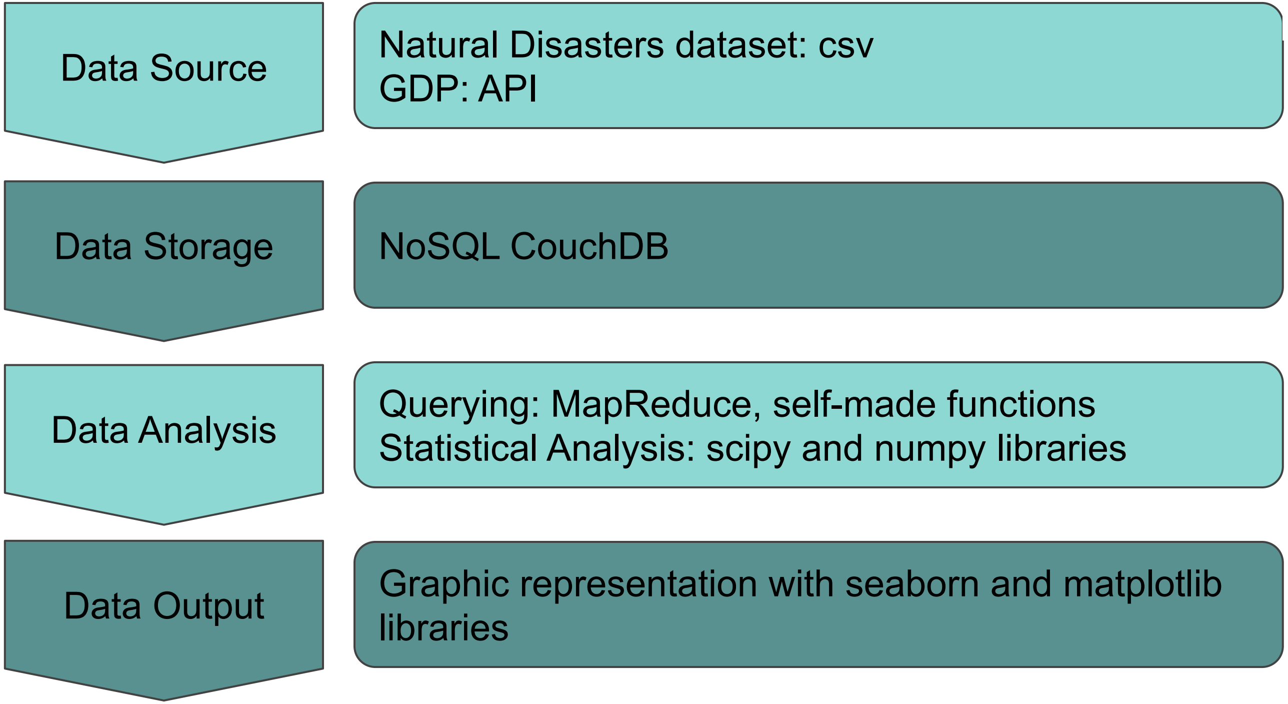
Variety

Veracity

Value



4 Levels of Data Handling



Data Source	Natural Disasters dataset: csv GDP: API
Data Storage	NoSQL CouchDB
Data Analysis	Querying: MapReduce, self-made functions Statistical Analysis: scipy and numpy libraries
Data Output	Graphic representation with seaborn and matplotlib libraries

Questions
Feedback